

Factors Influencing Profitability of Banks in India

Bezawada Brahmaiah, Ranajee*

Finance and Accounting at IBS, IFHE, Hyderabad, India

Email: brahmaiahb@ibsindia.org, brahmaiahb@yahoo.com, *ranajee@ibsindia.org

How to cite this paper: Brahmaiah, B. and Ranajee (2018) Factors Influencing Profitability of Banks in India. *Theoretical Economics Letters*, 8, 3046-3061.

<https://doi.org/10.4236/tel.2018.814189>

Received: July 5, 2017

Accepted: October 21, 2018

Published: October 24, 2018

Copyright © 2018 by authors and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

The paper examines the factors influencing the profitability of Indian commercial banks considering increased globalization, intensified competition, and enhanced concentration. The sample is a balanced panel dataset of 89 banks operating in India for the period 2005 to 2015. We consider the return on assets (ROA) and the return on equity (ROE) as proxy for measurement of banks' profitability. The results indicate that profitability of banks in India is affected by both internal and external factors. Strength of equity capital, operational efficiency, ratio of banking sector deposits to the gross domestic product (GDP), had significantly positive effect on profitability of banks and credit risk, cost of funds, non-performing assets (NPA) ratio and consumer price index (CPI) inflation have significantly negative influence on banks' profitability while bank size and ratio of priority loans to total loans do not have any influence on the profitability. The GDP growth and inflation have significantly negative relation with ROA and inflation has positive influence on ROE.

Keywords

Banks Profitability, Internal Factors, External Factors

1. Introduction

During the last three decades, major banking reforms have been introduced by the Reserve Bank of India (RBI) to improve the strength, health, performance and profitability of the banking industry. These reforms and changes were aimed to improve the quality of regulation, create healthy competition, and efficient functioning of banking industry. Reforms and liberalization in financial and banking sectors created fierce competition, technology improvement, global integration and development of new banking products. It is reasonable to assume

that all these changes must have had some impact on banks' profitability and performance. Hence, understanding underlying factors that influence banks' profitability is essential, not only for the managements of the banks but for other stakeholders such as the shareholders, deposit holders, employees, customers, Governments of India, and RBI. The determinants of bank performance have assumed the greater interest of research in banking area in general and factors that determine the profitability of banks in particular.

The objective of this study is to determine the factors influencing the bank profitability in India. Factors of profitability are segregated into categories of bank specific, industry specific and macroeconomic variables. The paper also explores the impact of ownership on profitability. What separates this paper from the more recent empirical work is that our sample consists of all 89 commercial banks which accounts for about 98 percent of commercial banks' assets, deposits and business in India [1]. We include more recent years 2005 to 2015, increased the number explanatory variables of bank specific and industry related variables and macroeconomic variables in the analysis. The main contribution of this study is how bank-specific, industry-specific and macroeconomic determinants affect performance and profitability of Indian banking industry as measured by return on assets (ROA), and return on equity (ROE). This paper investigates, in a single equation framework, the effect of bank-specific, industry specific and macroeconomic determinants on bank profitability. The paper is structured as follows. Section 2 provides review of development of Indian banking Sector, Section 3 covers literature review related to the determinants of banks profitability and Section 4 describes the dependent and independent variables used, methodological approach adopted. The empirical results and concluding remarks are discussed in Section 5.

2. Development of Indian Banking Sector

The present banking structure comprises of 89 scheduled commercial banks, 26 public sector banks¹ 20 private sector banks² and 43 foreign banks. These banks account for 98 per cent of the banking business in India [2]. Commercial bank credit as per cent of gross domestic product (GDP) picked up from 23.6 per cent in 2001 to 52 per cent by 2015. The ratio of bank deposits also grew from 44 per cent to 68 per cent during the same period [3]. Most of the nationalized banks and private sector banks are listed on the Indian stock exchanges and these are actively trading at the stock exchanges. The present banking structure in India has evolved over several decades, and has been catering to the banking needs of the country. The banking industry plays a major role in the mobilization of savings and promoting economic development. In the post financial sector reforms, the performance and strength of the banking industry improved perceptibly. Financial soundness of the Indian banking system can be considered as one of the

¹6 SBI and its associates, 20 nationalized banks.

²13 old private sector banks and 7 new private sector new generation banks.

best banking systems in the world [4]. Prior to the nationalization, banking was restricted to the urban areas. Post nationalization, the Indian banking experienced tremendous growth in deposits mobilization, sanctions of loans and overall banking business. By 1990, the country's banking and financial systems had an inefficient and unsound banking sector. Based on recommendations of Committee on Financial Sector Reforms, 1991 [5]. RBI introduced several reforms such as reduction of reserve requirements, deregulation of interest rates, introduction of prudential norms, strengthening of bank supervision and improving the competitiveness of the system by allowing entry of private banks. The RBI also introduced Basel II norms of minimum capital requirements for banks to address the issues relating to health. The Committee on Banking Sector Reforms, 1998 [6] discussed the issues such as strengthening of the banking system, upgrading of technology and human resource development. The report laid emphasis on two aspects of banking regulation, viz., capital adequacy and asset classification and resolution of Non-performing assets (NPAs). The banking industry faces a number of challenges such as frequent changes and developments in banking, technology, stringent prudential norms, increasing competition, high level of nonperforming assets, rising customer expectations, increasing demand on profitability, and increasing pressure on interest, liquidity and credit risk management.

The banking industry plays a major role in the mobilization of savings and promoting economic growth and development of the country. On account of various policy initiatives and reform measures, resilience of the Indian banking system has improved over the years and it was able to withstand adverse economic and financial conditions from time to time [3]. The soundness of the system was evident from the way it withstood the recent financial crisis, even as the banking systems in many countries across the world were adversely affected [7]. There were reforms in the form of deregulation of interest rates, dilution of directed credit controls, reduction of statutory liquidity ratio, cash reserve ratio, liberal licensing policy for new private sector banks and liberalization of entry barriers for foreign players. Deregulation process started which allowed new entrants and adoption of information technology resulting in increase of competition and demanding better products and services.

In the Indian context, banking industry has been influenced by liberalization, privatization and globalization and Basel Norms. This has been reflected by the continued diversification across geographical areas, business lines and product diversification. In view of these developments and given the shortage of studies in the Indian context, it is imperative to undertake this study (Figure 1).

3. Literature Review

3.1. Literature Review on Bank Specific Factors and Profitability

Athanasoglou *et al.* [8] Molyneux and Thornton [9] report a positive relation between the level of interest rates, bank concentration and the government

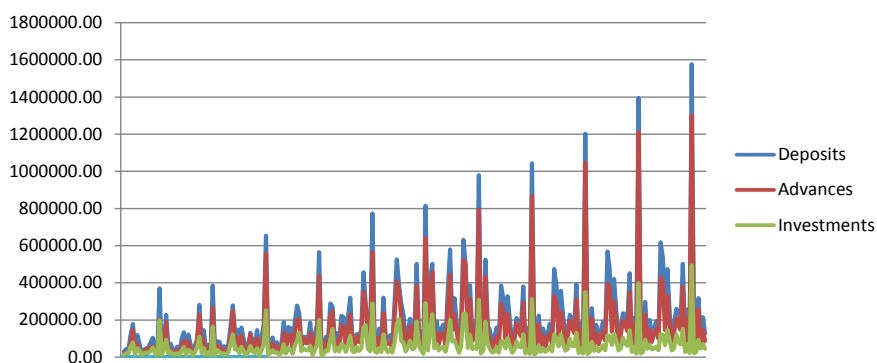


Figure 1. Deposits, advances and investments of banks from 2005-2015 (in INR billions).

Source: Compiled by Authors, data from:

<https://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications#!4>.

ownership and return on equity (ROE). Berger and Humphrey [10] studied about cost efficiency and reported that domestic banks are on average less cost efficient than foreign banks in US whereas Berger *et al.* [11] find European countries have cost and profit efficiency to be higher for domestic banks than foreign banks. Goddard *et al.* [12] report operating efficiency to have a positive impact on net interest margin. There is a positive relationship between bank profitability and risk while bank size has an insignificant impact on profitability. Victor *et al.* [13] report a higher ownership concentration is associated with better loan quality, lower asset risk and lower insolvency risk. Public sector banks have poorer loan quality and higher insolvency risk than other types of banks. Ownership concentration does not significantly affect a bank's profitability (Tan and Floros [14], Iannotta *et al.* [15]. Alexiou and Sofoklis [16]), using six Greek banks suggest that for any consistent or systematic size, the profitability relationship is relatively weak. Most of the bank-specific determinants are significantly affect bank profitability and find joint-stock commercial banks have higher profitability than state-owned commercial banks over the examined period. Sufian [17] results show that Chinese commercial banks with higher levels of credit risk, higher levels of capitalization and larger size in terms of total assets have higher profitability and banks with higher levels of liquidity and higher levels of overhead costs have lower profitability. Heffernan and Fu [18] find that banks with higher efficiency have better performance and bank listing contributes to the performance improvement while the impacts of bank size and off-balance-sheet activities on bank profitability are insignificant. Hoffmann [19] finds a negative link between the capital ratio and the profitability, which supports the notion that banks are operating over-cautiously and ignoring potentially profitable trading opportunities.

Growe *et al.* [20] study profitability of U.S. regional banks. They find the efficiency ratio and provisions for credit losses are negatively related to profitability. The level on performing assets is negatively related to profitability across all measures of profitability used. Tan [21] finds that Chinese bank profitability is affected by taxation, overhead cost, labor productivity and inflation. Albulescu

[22] studies the banks' profitability in a set of emerging countries and finds that non-performing loans have a negative impact on banks' profitability under the fixed effect model. The non-interest expenses negatively impact the profitability. The results are robust for both the return on assets and the return on equity indicator to measure the level of profitability. Chavarin [23] studies the determinants of profitability for commercial banks in Mexico and suggests that the profitability of commercial banking is sustained by the level of capital, commissions and fees, and control of operating expenses, relatively high persistence of profitability.

For studies in the Indian banking sector, Ganesan [24] examines the determinants of profitability of public sector banks in India. Study finds that interest cost, deposits per branch, credit to total assets, proportion of priority sector advances and interest income are the significant determinants profitability. Bodla and Verma [25] investigates the determinants of Indian banks profitability and find operating expenses, non-interest income, provisions and spread have significant relationship with net profits. Bhatia *et al.* [26] examine the determinants of profitability in the private sector banks in India with a sample of 23 banks. The results show that spread ratio, non-interest income, operating expense ratio, profit per employee, and non-performing assets are significant variables in affecting the profitability of banks in the private sector. Thota [27] studied bank-specific (internal) and macroeconomic (external) factors that affect the profitability of Indian banks. The study finds that profitability of commercial banks in India is affected by both internal and external factors. Sinha and Sharma [28] examine the factors affecting the profitability of 42 Indian Banks. Bank-specific variables such as capital to assets ratio, operating efficiency and diversification have been found to be significantly and positively affecting the bank profits. Risk negatively impacts the bank profitability.

3.2. Literature Review on Industry Specific Factors and Profitability

Berger *et al.* [29] study the USA banking sector and find that state level variables do have significant relationship in explaining bank performance. Scott and Arias [30] conclude that banking as an industry is ever changing, competition and technology have made it complex but common grounds for the profitability of banking as an industry can be established. Tan [31] finds the impacts of risk and competition on profitability in the Chinese banking industry and finds that Chinese bank profitability is affected by taxation, overhead cost, labor productivity and inflation. Chronopoulos, *et al.* [32] find in their study that the competition in the banking industry has implications for the level of business activity, access to finance, the allocation of capital funds, the competitiveness and development of industry and services of the economy, the level of economic growth and the financial stability. Petria *et al.* [33] assess the main determinants of banks' profitability in the EU27. Credit and liquidity risk, management efficiency, the diversification of business, the market concentration and the economic

growth have influence on bank profitability. There is the positive influence of competition on bank profitability in EU27.

3.3. Literature Review on Macroeconomic Factors and Profitability

Ganesan [27] studies the public sector bank and concluded that banks profitability respond positively to GDP growth, and negatively to inflation growth rate. Pasiouras and Kosmidou [34] find that profitability of banks is affected by financial market structure and macroeconomic conditions. Inflation has a strong effect on profitability of banks and banks' profits are not significantly affected by the real GDP fluctuations. Sufian [35] shows both economic growth and inflation precede an improvement in banks' profitability in China. Heffernan and Fu [36] studied determinants of performance for state-owned, joint-stock, city and rural commercial banks. They find that Chinese bank profitability is significantly affected by real GDP growth rate and unemployment. Lui and Wilson [31] examine Japanese banks' profitability and find that well capitalized, efficient banks, and with lower credit risks performed better and industry concentration, GDP growth and stock market development showed a positive relationship with profits. Tan and Floros [37] test the impact of inflation on bank profitability of banks in China. The results show that Chinese banks with lower levels of diversification, lower levels of overhead cost and lower levels of taxation have higher profitability; while they find that higher developed banking market and higher developed stock market lead to profitability improvement in Chinese commercial banks.

Literature reveals that bank profitability as a function of internal and external determinants. The internal determinants are the micro or bank-specific determinants of profitability while the external determinants are not related to bank management but reflect the industry and economic environment that affects the operation and performance of banking industry. Both endogenous and exogenous determinants affected the profitability and earnings of the banks. Findings of literature are not conclusive. Literature review reveals that higher capital ratio, high interest margin, higher inflation rates, operational efficiency and higher non-interest income are positively associated with bank profitability while higher credit risk and cost of capital are negatively associated with bank profitability. Literature considers determinants of profitability at the bank level and industry level, with the selection of different variables. Not many studies on investigation of the effect of the financial and banking market development and macroeconomic environment on Indian bank profitability.

4. Sample Selection, Variables and Econometric Models

4.1. Sample Description

The sample is a balanced panel dataset of 89 commercial banks operating in India over the period 2005 to 2015. We have restricted the sample time period till

2015 as the data for the study is taken from the RBI website which reports the data with a one year lag. We divide banks into two groups based on their ownership. The groups are government banks (public sector banks) and non-government banks. There are 26 public sector, 20 private sector banks and 43 foreign banks operating in India (under foreign ownership). The analyses in the paper require data for bank specific variables, industry specific variables and macroeconomic variables.

Sources of Data—Data for bank specific variables were collected from RBI published ‘Statistical Tables Relating to Banks in India. For industry variables we used data from World Bank and RBI. Macroeconomic specific data on inflation and GDP growth rate were obtained from Handbook of Statistics on Indian Economy, published by RBI. **Table 1** describes the data used and their computation method followed in the paper.

4.1.1. Variables

Dependent variables: We measure profitability using the return on assets (ROA), and return on equity (ROE). ROA reflects the ability of a bank’s management to generate profits from the bank’s assets while ROE indicates the return to shareholders on their equity and equals ROA times the total assets-to-equity ratio. ROE ignores the risks associated with high leverage and financial leverage is often determined by regulation and ROA emerges as the key ratio for the evaluation of bank profitability.

Explanatory Variables: Literature divides factors influencing bank profitability are generally into two *i.e.* internal (bank-specific) factors and industry and macroeconomic (external) factors. This study uses the following internal factors; bank size, bank ownership, equity capital to total assets, credit risk, (loss provisions to total loans), NPA ratio (gross NPA to total assets), cost of funds, operational efficiency (operating cost to total assets), priority sector lending to total assets, labor productivity (internal), ratio of total bank deposits to the GDP, ratio of stock market capitalization to the GDP (industry related), and growth of inflation, and GDP growth (external macroeconomic factors).

1) **Bank size:** We use the total assets of the bank (log). Generally, the effect of a growing size on profitability has been proved to be positive to a certain extent. However, for banks that become extremely large, the effect of size could be negative due to bureaucratic and other reasons. The effect is not clear. On the one hand, banks with larger size are able to reduce costs from economies of scale and scope. On the other hand some argue that small banks can obtain economies of scale by increasing their size to a certain point where further increase in size will result in diseconomies of scale. So there is not a prior expectation on the impact of this variable on bank profitability.

2) **Bank ownership:** There is no clear empirical evidence to support a positive relationship between ownership and profitability, the peculiarity of the Indian banking sector. To capture this relationship we follow the literature and using a dummy variables one for public sector banks and zero for private ownership banks and foreign banks.

Table 1. Variables used in the study and their expected effect on bank performance.

Variables	Measurement	Expected Relation (+/-)
Profitability indicators (Dependent Variables)		
1) ROA	Net income to total assets	
2) ROE	Net income to shareholder's equity	
Bank specific characteristics (internals factors)		
1) Bank size	Natural logarithm of total assets	?
2) Bank ownership	Dummy variables Govt-1, others-0	?
3) ECTA	Shareholder's equity/total assets	?
4) Operating efficiency	Operating expenses to total assets	?
5) Credit risk	Loan loss provisions to total loans	-
6) NPA ratio	NPAs to total loans	-
7) Ratio of PSL	Priority sector advances to total advances	?
8) Ratio of Interest Income	Interest income to total Income	+
9) Ratio of Wage to TI	Wage bills to total income	+
10) Cost of funds (KF)	Interest cost to total liabilities	-
Banking Industry factors (external factors)		
1) DPGDP	Banking sector deposits to GDP	+
2) MCAPGDP	Market capitalization of listed Cos to GDP	+
Macroeconomic factors (external)		
1) Inflation	Inflation growth rate	?
2) GDP growth	Annual GDP growth rate	+

Source: Compiled by authors, based on literature survey.

3) **Equity capital to total assets (EC TA):** We use the ratio of shareholders' equity to total assets as the proxy ([8] [9] [29]).

4) **Operating efficiency (OE):** We use operating expenses to total assets of banks as proxy for operating efficiency. This measurement has been used extensively in the literature.

5) **Credit risk (CR):** We use the ratio of total loss provisions to gross total loans (TL) of the banks. It exhibits the loss probability because of the failure of the debtor to fulfill its obligations to the bank.

6) **NPA Ratio:** We use the ratio nonperforming assets to total assets as proxy. This ratio has direct bearing on profitability of banks.

7) **Ratio of PSL:** we use the ratio of priority sector advances to total advances of the banking sector. In India banks are required to set certain percentage of loans to priority sectors such as agriculture, housing, educational, small and medium enterprises, export oriented units. So there is no a prior expectation for this variable on profitability.

8) **Ratio of Interest Income (RII):** We measure this variable by using the ra-

tio of interest income over gross revenue. In addition, the banks with more diversified activities have the ability to reduce their costs from economies of scale. However, there is stronger competition in the area of fee income generating business, which precedes a decrease in bank profitability. So there is no a prior expectation for this variable.

9) **Labor productivity (LP):** We use the ratio of gross revenue over total number of employees. This variable has been widely used to examine its impact on bank profitability. Higher labor productivity not only reflects efficient bank management, but also increases the bank's efficiency and further fosters the bank's profitability. To examine whether the observed improvements in productivity growth have benefited bank profits, we include the rate of change in labor productivity (measured by real gross total revenue over the number of employees) in the model.

10) **Cost of funds (KF):** This ratio is calculated as total cost of funds *i.e.* interest paid on deposits and other borrowings of the bank. We use this ratio as proxy to cost of funds. Higher the cost of funds and lower will be the profitability of banks.

4.1.2. Industry-Specific Determinants

1) **Banking sector development to GDP (DPGDP):** We use ratio of total deposits of banking sector to the GDP of the country. It reflects the overall level of development of banking sector and measures the importance of bank mobilization of savings in the economy.

2) **Stock market development to GDP (MCAPGDP):** We use ratio of stock market capitalization to the GDP. This variable serves as a proxy of financial development and the relationship between bank finances and capital market financing and development. Higher developed stock market increases the number of firms to obtain funds from stock market rather than banks. This not only reduces the volume of loans provided by banks, but also decreases the risk of loan default (**Figure 2, Figure 3**).

4.1.3. Macroeconomic Determinants

1) **GDP growth rate**—The economic growth, expressed by the GDP growth, has multiple effects among which is the increase of bank activity. Researchers argue that it has a positive impact on bank profitability due to the fact that the demand for lending increases during cyclical upswings. Increase of bank deposits and loans has a positive impact on bank profitability. When the economic activity decreases, the demand for loans and deposits decreases and negatively affects the profit margins.

2) **Inflation**—Inflation is an important determinant of bank performance and widely examined by researchers.

4.2. Summary Statistics and Correlation Matrix

This section provides summary statistics and correlation coefficients of the variables used in the analysis. **Table 2** presents the descriptive statistics for these

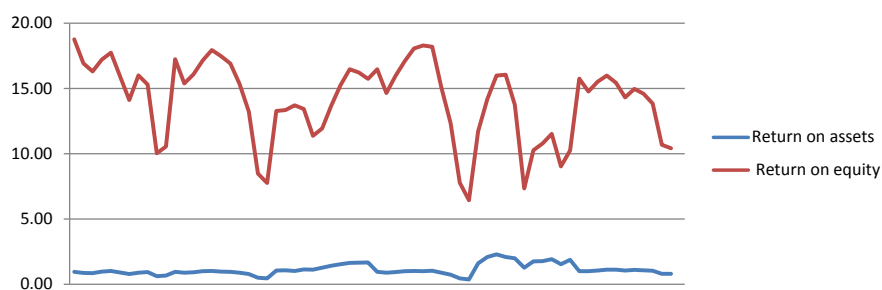


Figure 2. Dependent variables. Source: Compiled by Authors, data from: <https://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications#!4>.

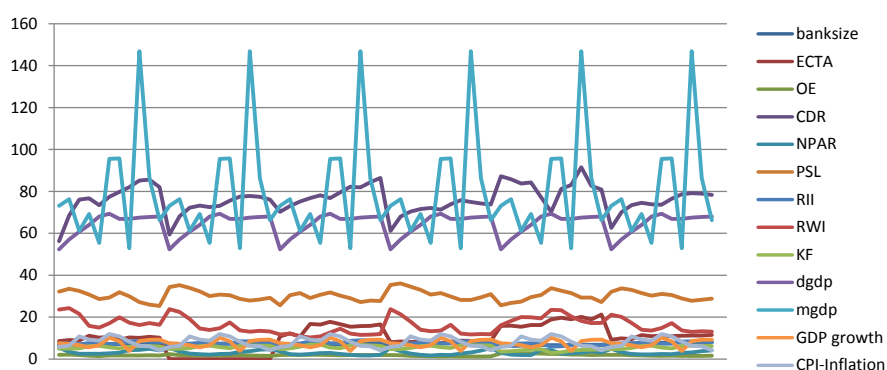


Figure 3. Independent Variables. Source: Compiled by Authors, data from: <https://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications#!4>.

Table 2. Descriptive statistics.

Descriptive Statistics	Mean	Standard Error	Median	Standard Deviation	Sample Variance	Kurtosis	Skewness	Range	Minimum	Maximum
ROA	1.12	0.05	1.02	0.42	0.17	0.57	0.96	1.91	0.37	2.28
ROE	14.15	0.37	15.01	3.03	9.15	-0.19	-0.77	12.31	6.44	18.76
banksize	7.22	0.05	7.24	0.42	0.18	-0.31	-0.13	1.89	6.19	8.08
ECTA	10.39	0.72	10.52	5.83	33.97	-0.40	-0.35	21.19	0.08	21.28
OE	1.96	0.05	1.96	0.38	0.14	0.62	0.70	1.62	1.32	2.94
CDR	76.16	0.81	76.33	6.59	43.46	0.99	-0.52	35.20	56.31	91.51
NPAR	3.15	0.13	2.87	1.03	1.05	-0.63	0.67	3.62	1.75	5.36
PSL	30.36	0.31	30.34	2.51	6.32	-0.40	0.22	10.75	25.43	36.18
RII	7.71	0.09	7.60	0.69	0.48	-0.36	-0.26	3.05	5.99	9.04
RWI	16.20	0.48	15.47	3.88	15.02	-0.76	0.55	14.00	10.35	24.35
KF	5.61	0.12	5.70	0.94	0.87	-0.17	-0.66	3.98	3.02	7.00
dpgdp	64.48	0.64	66.90	5.24	27.44	0.30	-1.26	17.00	52.40	69.40
Mcapgdp	79.89	3.14	73.12	25.52	651.22	1.94	1.51	93.98	52.87	146.86
GDP growth	7.59	0.22	7.57	1.78	3.15	-0.36	-0.51	6.37	3.89	10.26
Inflation	8.12	0.30	8.35	2.40	5.77	-1.23	0.11	7.75	4.25	11.99

Source: Computed by Authors, data from: <https://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications#!4>.

key variables. Panel A shows the descriptive statistics for the bank performance measures. The dependent variables ROA and ROE have mean values of 1.12% and 14.14%, respectively. The mean value for GDP growth is 7.6% whereas for inflation it is 8.11%. Cost of fund has a mean value of 5.6%. Priority sector lending is 30%, MCAPGDP, CDR and DPGDP have slightly higher mean value. As for the control variables, we have used to categories of bank which are government and non-government banks. **Table 3** presents the correlation coefficients of the independent variables used in the study. Pearson correlation coefficients are portrayed below the diagonal. The matrix shows that in general the correlation between the bank specific variables is not strong suggesting that multi-collinearity problems are not severe or non-existent 0.70, which is not the case here.

4.3. Econometric Model

We empirically assess the main (bank specific industry specific and macroeconomic) factors that determine the profitability of banks in India. Following Kosmidou *et al.*, [37] Pasiouras and Kosmidou [34], Ben Naceur and Goaided [38] and Sufian and Habibullah [35] studies, we estimate a linear regression model. The linear regression used to estimate the model is as follows,

$$P_{it} = C + \sum_{K=1}^K B_K Y_{it}^K + \varepsilon_{it} \quad (1)$$

where,

P_{it} = Profitability of bank group i at time t .

Y_{it}^k 's are k explanatory variables and

ε_{it} is the error term such that sum of all the error terms is equal to zero.

The explanatory variable Y_{it}^k 's are further classified into bank specific, industry specific and macroeconomic specific variables and model (1) takes the following form,

$$P_{it} = C + \sum_{b=1}^B B_b Y_{it}^b + \sum_{i=1}^I B_i Y_{it}^i + \sum_{m=1}^M B_m Y_{it}^m + \varepsilon_{it} \quad (2)$$

where Y_{it}^b 's with superscript b are bank specific variables, with superscript i are industry specific variables and with superscript m are macroeconomic specific variables. ε_{it} is the error term. ε_{it} is normally distributed and random. The regression analysis is estimated using robust standard errors. In the OLS regression, both fixed effect and random effect model were estimated. On the basis of Durbin-Wu-Hausman test, fixed effect model is found to be robust for both ROA and ROA analysis and the fixed effect results are reported in next section. Random effect Model results are not reported.

5. Results, Conclusions and Discussions

Our sample data have cross sectional data of banks across years ranging from 2005 to 2015. We have used regression model to establish relationship between

Table 3. Correlation matrix.

	ROA	ROE	Banksize	ECTA	OE	CDR	NPAR	PSL	RII	RWI	KF	dpgdp	mcapgdp	GDP growth	Inflation
ROA	1.00														
ROE	0.09	1.00													
banksize	-0.59	-0.06	1.00												
ECTA	0.69	-0.30	-0.36	1.00											
OE	0.72	-0.04	-0.80	0.40	1.00										
CDR	0.48	-0.34	-0.09	0.50	0.22	1.00									
NPAR	-0.45	-0.44	0.08	-0.21	0.00	-0.33	1.00								
PSL	-0.19	0.26	-0.08	-0.25	-0.02	-0.68	0.09	1.00							
RII	-0.30	0.13	0.61	-0.24	-0.47	0.18	-0.05	-0.37	1.00						
RWI	0.18	0.16	-0.46	0.00	0.49	-0.33	0.33	0.55	-0.62	1.00					
KF	-0.50	0.11	0.68	-0.33	-0.69	0.04	-0.09	-0.29	0.91	-0.75	1.00				
dpgdp	-0.02	-0.28	0.46	0.14	-0.40	0.52	-0.24	-0.35	0.41	-0.48	0.44	1.00			
Mcap gdp	-0.01	-0.11	0.16	0.05	-0.11	0.21	0.04	-0.20	0.07	-0.07	0.02	0.22	1.00		
GDP growth	-0.14	-0.36	0.16	0.05	-0.11	0.03	0.23	-0.13	-0.15	-0.02	-0.11	0.25	0.56	1.00	
Inflation	0.12	0.36	-0.10	0.00	-0.02	-0.06	-0.54	0.35	-0.23	0.08	-0.15	0.24	-0.06	-0.10	1.00

Source: Computed by Authors, data from: <https://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications#14>.

endogenous (ROA, ROE) variables of bank performance and exogenous variables of bank specific, industry specific and macroeconomic variables as described in **Table 1**. **Table 4** presents the results of Pooled OLS estimates of Equation (2), when considering ROA and ROE as our dependent variables, respectively. Coefficients and their significance are reported. In general, the model is well-fitted, with an adjusted R-square of 0.86 for ROA and 0.74 for ROE. For all the dependent variables and in all estimations we have statistically significant F-statistics.

Form the standard bank specific variables, we find that for explaining ROA, strength of equity capital (ECTA), operational efficiency (OE), and ratio of interest income (RII), are positive and significant. For bank's return on asset, the impact of credit risk (CDR) is negative and significant. Nonperforming assets (NPAR) and cost of funds (KF) are also found to be negative and significant. In industry specific variables banking growth in terms bank deposits to GDP (DPGDP) is found to be positive and significant in case of ROA. Form the macroeconomic variables GDP growth and inflation both are negative and significant for ROA.

For ROE, in the standard bank specific variables ratio of interest income (RII) and expenses on employees (RWI) are positive and significant whereas the impact of credit risk (CDR) is negative and significant. Nonperforming assets (NPAR) and extent of priority sector lending (PSL) are also found to be negative and significant. In industry specific variables banking growth in terms bank

Table 4. Regressions results (dependent variables: ROA & ROE).

ROA Analysis	Coefficients	t Stat	ROE Analysis	Coefficients	t Stat
Intercept	1.47	1.49	Intercept	39.70***	4.02
Bank size	-0.08	-0.80	Bank size	-1.02	-1.08
ECTA	0.02***	4.85	ECTA	-0.05	-1.06
OE	0.49***	4.08	OE	-1.00	-0.84
CDR	-0.01***	-2.32	CDR	-0.20***	-3.22
NPAR	-0.20***	-6.92	NPAR	-2.13***	-7.33
PSL	-0.01	-0.89	PSL	-0.42***	-3.07
RII	0.23***	2.34	RII	1.81	1.85
RWI	0.00	-0.41	RWI	0.58***	5.18
KF	-0.29***	-3.09	KF	0.92	0.96
Dgdp	0.02***	3.32	Dgdp	-0.18***	-2.50
Mgdp	0.00	1.21	Mgdp	0.01	1.03
GDP growth	-0.03**	-1.92	GDP growth	-0.10	-0.59
CPI-Inflation	-0.04***	-2.98	CPI-Inflation	0.26**	1.96
Fixed Effects	YES		Fixed Effects	YES	

***indicates significance at 1% Level of confidence whereas. **indicates significance at 5% Level of confidence.

deposits to GDP (DPGDP) is found to be negative and significant in case of ROE. Form the macroeconomic variables only inflation is significant and positive for ROE.

Because of widespread competition in banking sector the size of banks doesn't matter for bank profitability of ROE and has a small and weak significant effect in the case of ROA. Regarding the relationship between bank size and profitability of the Indian banks in both measure of the profitability we find negative signs across all types of banks. Moreover none of the coefficients are significant. Equity to total assets appeared to be the most significant determinant of profitability of banks. The operating efficiency ratio is highly significant and positively associated with it.

These results have relevance to regulators, bankers, bank managements and other stakeholders. For bank managements and shareholders, the findings will help to identify the key factors, internal and external to achieve profitability which in turn leads to stability and sustainability of profitability at the bank level which is important due to the increased competition through globalization of banking. For shareholders, it helps to assess how varying bank characteristics can alter the profitability and returns in sequence. As a policy recommendation for the Reserve Bank of India, we suggest a better supervision for credit risk and effective management of nonperforming assets and improve quality assets of banks and encouraging the competition in banking industry. For banks' decision

makers, we also recommend to monitor the credit and cost of funds indicators, to diversify the sources of revenues and to optimize costs.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Reserve Bank of India (2015) Report on Trend and Progress of Banking in India 2015-16.
- [2] Reserve Bank of India (2013) Banking Structure in India—The Way Forward Discussion Paper.
- [3] Reserve Bank of India (2015) Financial Stability Report.
- [4] Reserve Bank of India (2016) Basic Statistical Returns of Scheduled Commercial Banks in India. Vol. 41.
- [5] Committee on Financial Sector Reforms (Chairman: Shri M. Narasimham) (1991).
- [6] Committee on Banking Sector Reforms (Chairman: Shri M. Narasimham) (1998).
- [7] Sinha, A. (2012) Indian Banking—Journey into the Future. *Reserve Bank of India Monthly Bulletin*, **8**, 43-49.
- [8] Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D. (2008) Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability. *Journal of International Financial Markets, Institutions & Money*, **18**, 121-136.
<https://doi.org/10.1016/j.intfin.2006.07.001>
- [9] Molyneux, P. and Thornton, J. (1992) Determinants of European Bank Profitability: A Note. *Journal of Banking and Finance*, **16**, 1173-1178.
[https://doi.org/10.1016/0378-4266\(92\)90065-8](https://doi.org/10.1016/0378-4266(92)90065-8)
- [10] Berger, A.N. and Humphrey, D.B. (1997) Efficiency of Financial Institutions: International Survey and Directions for Future Research. *European Journal of Operational Research*, **98**, 175-212. [https://doi.org/10.1016/S0377-2217\(96\)00342-6](https://doi.org/10.1016/S0377-2217(96)00342-6)
- [11] Berger, A.N., De Young, R., Genay, H. and Udell, G.F. (2000) Globalization of Financial Institutions: Evidence from Cross-Border Banking Performance. *Brookings-Wharton Papers on Financial Services*, No. 1, 23-120.
<https://doi.org/10.1353/pfs.2000.0001>
- [12] Goddard, J., Molyneux, P. and Wilson, J. (2004) Dynamics of Growth and Profitability in Banking. *Journal of Money, Credit and Banking*, **36**, 1069-1090.
<https://doi.org/10.1353/mcb.2005.0015>
- [13] Victor, S., Zhang, Q. and Liu, M.X. (2007) Comparing the Performance of Chinese Banks: A Principal Component Approach. *China Economic Review*, **18**, 15-34.
<https://doi.org/10.1016/j.chieco.2006.11.001>
- [14] Tan, Y. and Floros, C. (2012) Bank Profitability and Inflation: The Case of China. *Journal of Economic Studies*, **39**, 675-696.
<https://doi.org/10.1108/01443581211274610>
- [15] Iannotta, G., Nocera, G. and Sironi, A. (2007) Ownership Structure, Risk and Performance in the European Banking Industry. *Journal of Banking & Finance*, **31**, 2127-2149. <https://doi.org/10.1016/j.jbankfin.2006.07.013>
- [16] Alexiou, C. and Sofoklis, V. (2009) Determinants of Bank Profitability: Evidence

- from the Greek Banking Sector. *Economic Annals*, **54**, 93-118.
<https://doi.org/10.2298/EKA0982093A>
- [17] Sufian, F. (2009) Determinants of Bank Profitability in a Developing Economy: Empirical Evidence from the China Banking Sector. *Journal of Asia-Pacific Business*, **10**, 281-307. <https://doi.org/10.1080/10599230903340205>
- [18] Heffernan, S.A. and Fu, X. (2010) Determinants of Financial Performance in Chinese Banking. *Applied Financial Economics*, **20**, 1585-1600.
<https://doi.org/10.1080/09603107.2010.505553>
- [19] Hoffmann, P.S. (2011) Determinants of the Profitability of the US Banking Industry. *International Journal of Business and Social Science*, **2**, 255-269.
- [20] Growe, G., et al. (2014) Profitability and Performance Measurement of U.S. Regional Banks. *Advances in Management Accounting*, **24**, 189-237.
<https://doi.org/10.1108/S1474-787120140000024006>
- [21] Tan, Y. (2016) The Impacts of Risk and Competition on Bank Profitability in China. *Journal of International Financial Markets, Institutions and Money*, **40**, 85-110.
<https://doi.org/10.1016/j.intfin.2015.09.003>
- [22] Albulescu, C.T. (2015) Banks' Profitability and Financial Soundness Indicators: A Macro-Level Investigation in Emerging Countries. *Procedia Economics and Finance*, **23**, 203-209. [https://doi.org/10.1016/S2212-5671\(15\)00551-1](https://doi.org/10.1016/S2212-5671(15)00551-1)
- [23] Chavarín Rodríguez, R. (2015) Determinants of Commercial Bank Profitability in Mexico. *Econo Quantum*, **12**, 97-123.
- [24] Ganesan, P. (2001) Determinants of Profits and Profitability of Public Sector Banks in India: A Profit Function Approach. *Journal of Financial Management and Analysis*, **14**, 27-37.
- [25] Badola, B.S. and Verma, R. (2006) Determinants of Profitability of Banks in India: A Multivariate Analysis. *Delhi Business Review*, **7**, 79-88.
- [26] Bhatia, A., Mahajan, P. and Chander, S. (2012) Determinants of Profitability of Private Sector Banks in India. *Journal of Commerce and Accounting Research*, **1**, 14.
- [27] Nagaraju, T. (2013) The Determinants of Commercial Banks Profitability in India. <https://ssrn.com/abstract=2544838>
- [28] Sinha, P. and Sharma, S. (2016) Determinants of Bank Profits and Its Persistence in Indian Banks: A Study in a Dynamic Panel Data Framework. *International Journal of Systems Assurance Engineering & Management*, **7**, 35-46.
<https://doi.org/10.1007/s13198-015-0388-9>
- [29] Berger, A.N. (1995) The Relationship between Capital and Earnings in Banking. *Journal of Money, Credit and Banking*, **27**, 432-456.
<https://doi.org/10.2307/2077877>
- [30] Scott, J.W. and Arias, J.C. (2011) Banking Profitability Determinants. *Business Intelligence Journal*, **4**, 209-230.
- [31] Yong, T. and Floros, C. (2013) Risk, Capital and Efficiency in Chinese Banking. *Journal of International Financial Markets, Institutions and Money*, **26**, 378-393.
<https://doi.org/10.1016/j.intfin.2013.07.009>
- [32] Chronopoulos, D.K., Liu, H., McMillan, F.J. and Wilson, J.O. (2015) The Dynamics of US Bank Profitability. *The European Journal of Finance*, **21**, 426-443.
<https://doi.org/10.1080/1351847X.2013.838184>
- [33] Petria, N., Capraru, B. and Ihnatov, I. (2015) Determinants of Banks' Profitability: Evidence from EU 27 Banking Systems. *Procedia Economics and Finance*, **20**, 518-524. [https://doi.org/10.1016/S2212-5671\(15\)00104-5](https://doi.org/10.1016/S2212-5671(15)00104-5)

- [34] Pasiouras, F. and Kosmidou, K. (2007) Factors Influencing the Profitability of Domestic and Foreign Commercial Banks in the European Union. *Research in International Business and Finance*, **21**, 222-237. <https://doi.org/10.1016/j.ribaf.2006.03.007>
- [35] Sufian, F. and Habibullah, M.S. (2009) Bank Specific and Macroeconomic Determinants of Bank Profitability: Empirical Evidence from the China Banking Sector. *Frontiers of Economics in China*, **4**, 274-291. <https://doi.org/10.1007/s11459-009-0016-1>
- [36] Lui, H. and Wilson, J. (2010) The Profitability of Banks in Japan. *Applied Financial Economics*, **20**, 1851-1866. <https://doi.org/10.1080/09603107.2010.526577>
- [37] Kosmidou, K., Pasiouras, F. and Tsaklanganos, A. (2007) Domestic and Multinational Determinants of Foreign Bank Profits: The Case of Greek Banks Operating Abroad. *Journal of Multinational Financial Management*, **17**, 1-15. <https://doi.org/10.1016/j.mulfin.2006.02.002>
- [38] Ben Naceur, S. and Goaied, M. (2008) The Determinants of Commercial Bank Interest Margin and Profitability: Evidence from Tunisia. *Frontiers in Finance and Economics*, **5**, 106-130.